Geostrophic Balance with a full Coriolis Force: Implications for low Latitude Studies.

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In its standard form, geostrophic balance uses a partial representation of the Coriolis force. The resulting formulation has a singularity at the equator, and violates mass and momentum conservation. When the horizontal projection of the planetary rotation vector is considered, the singularity at the equator disappears, continuity can be preserved, and quasigeostrophy can be formulated at planetary scale. At the same time, the predicted geostrophic winds can differ significantly from the standard approach. Similarities and differences between both approaches to wind diagnostics are shown in an application example.